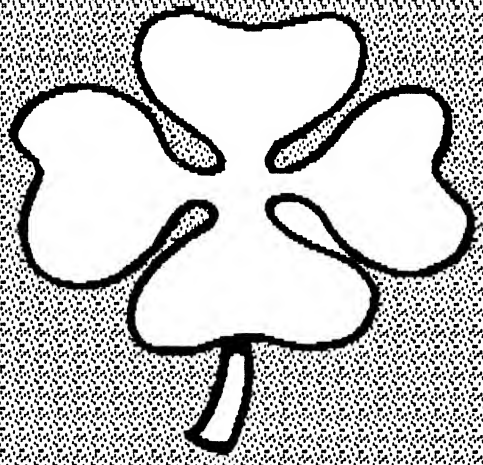
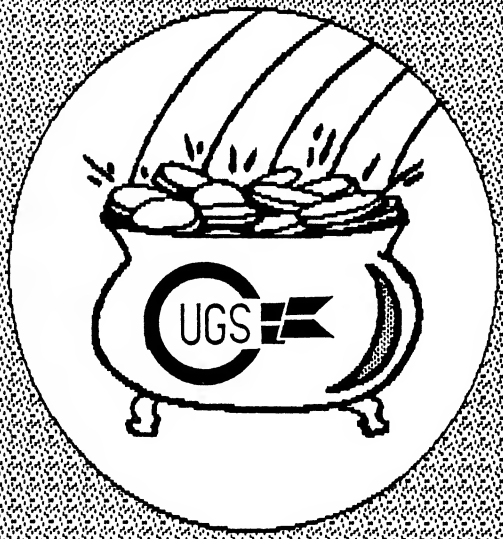
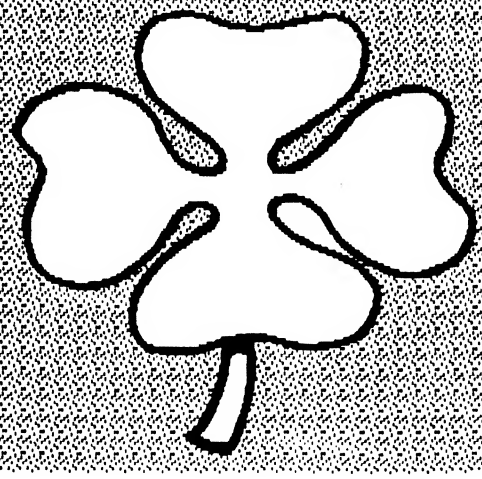
C. H. G. S.



MONITOR

MARCH 1988





Vol. 3 #3

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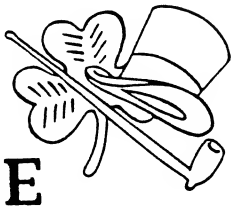
THE MONITOR is published monthly by the COMMODORE USERS' GROUP OF SASKATCHEWAN (CUGS), Regina, Sask., Canada. CUGS meetings are held at 7 pm the first Wednesday of every month (unless otherwise noted) in the North-West Leisure Centre, corner of Rochdale Boulevard and Arnason Street.

Anyone interested in computing, especially on the C64, 128 or 64C, is welcome to attend any meeting. Out of town members are also welcome, but may be charged a small ($5.00) mailing fee for newsletters. Members are encouraged to submit public domain software for inclusion in the CUGS DISK LIBRARY. These programs are made available to members. Any member is entitled to purchase DISKS from our public domain library for a nominal fee. Programs are 'freeware', from computer magazines, or the public domain. Individual members are responsible for deleting any program that he/she is not entitled to by law (you must be the owner of the magazine in which a particular program was printed). To the best of our knowledge, all such programs are identified in their basic listings. Please inform us should you find otherwise.

CUGS is a non-profit organization comprised of C64, 64C, C128, and 128D users interested in sharing ideas, programs, knowledge, problems and solutions with each other. The more members participate, the better the variety of benefits. Membership dues are pro-rated, based on a January to December year.



IN THIS ISSUE

IN THIS ISSUE:

MEETING PLACE

AGENDA:

MIXING MUSIC with your OWN programs!
Ken Danylczuk

*******coffee****visiting****disk-picking**********

From the sublime to the insidious.
EARL VS. THE TAX MAN!
Tax-aid from Earl Brown.

EDITORIAL

Been using your computer lately?

I have ... to update my disk catalog, write several documents (including this one), update my household inventory, prepare my 1987 tax return (thanks, Earl), prepare a graphic/sound display for a presentation I'll be making next month, play a few games, update my budget (home AND office), organize an equipment inventory for a friend, and prepare AND translate a track and field program for school use! (puff, puff, puff .... whew!)

So, now that my HUMILITY index has been established, what exactly IS my point?

"Well, Sonny", here the wizened old man, stooped and bent over his cane, rubbed his stubbled chin as he reminisced, "I re-call how in them old days, when thar warn't so much spectacler software, us users atchually had to WRIT OUR OWN BY OUR OWNSELF!!

"Gawsh!", breathed the young wide-eyed innocents gathered at his feet, clutching their 64's and "SKATE OR DIE" game disk to their bosoms, "You mean you REALLY ACTUALLY writ ... uh, wrote programs that made the computer WORK?!!"

The old fellow shifted his gaze down into their innocent, wondering faces. "Yup, an' they even worked, an' if they didn't work like we wanted WE CHANGED 'EM, MADE 'EM WORK PROPER-LIKE!"

"WOW, no kiddin'?", they murmured in awe as the camera pans away from the scene to focus on the setting sun on the horizon!

Ahem! Sorry, I got carried away. But it's true, there was a time when WE (the users) CONTROLLED AND USED THE COMPUTER. NOW, too often, we're simply CONSUMERS of computer software. I often make comparisons to music, because that's where my heart lies. I know so many people who CONSUME musical products and I KNOW HOW MUCH THEY'RE MISSING BY NOT KNOWING how to create the music themselves. I know that mass marketing is turning everyone it can into computer product CONSUMERS, I'm one myself - and it's a nice and comfortable thing to be - no fuss, muss, or bother as long as you can find a program that DOES what you want, or one which ALMOST does what you want. (And that's NOT as easy as you might believe.)

Now, I'm no fool, and my ma didn't raise no dummy. I don't believe that everyone can be a super-programmer. Nor do I believe that everyone would ENJOY programming, BUT the only way to really make full use of your machine AND your software is to learn a bit about making the machine YOUR tool following YOUR instructions. Knowing how one goes about making your computer store and sort information will help you select software to suit your needs more effectively.

One more comment on programming. I know that the vast majority of computer users (including our club members) spend most of their time using OTHER people's software, but that's no sin - like I said, I do it myself! But sometimes we spend a lot for software, and invest a lot of time LEARNING to use the software, when a simple, self-made program would do what we want, could change to suit our own changing circumstances, cost little (especially if programmed in BASIC) and take no time to learn! A case in point: the extent of most people's need for a home inventory program is so minimal that writing your own (with the knowledge gained from reading Richard's or other columns in this noble journal) or altering a FREE public domain program to meet your needs can be a doubly rewarding adventure.

So that's my soap-box for this month. I hope you'll consider the beast you sit before so much each month. Learn about it and its inner workings! You'll only learn to love it more, 'specially if it's a 64! (Hey, there's a poet inside me!)

See you USERS next month!

Maze on (the) March!

Computerfest is over and I would like to take this opportunity to thank the club members who so kindly gave of their time and energy to help make our club's presentation so successful. Our main objective in setting up a display at Computerfest was to build awareness of CUGS and judging by the number of people we talked with and explained the operation of our club to, we easily met this objective. We sold four new memberships at Computerfest and judging from the number of enquiries we had, I am sure we will have a number of new members joining CUGS as a result of our display.

Special thanks to Earl and Ken for the disks they prepared which we had running on a C64 and 128. These programs brought many people over for a closer look and to talk with us.

I also would like to thank all the club members who so kindly gave of their time to man the booth and answer the numerous questions we had. Thank you to all the club members who dropped by to say hello. Your comments and support were appreciated.

I would especially like to thank all the members of the public who dropped by and got information from us. Those of you who have joined our club have special meaning to the rest of us because you are the reason we set up our booth - to build interest in our computer club.

A final thank you to the Apple II user's group for sponsoring Computerfest and giving us the opportunity to be a part of this great display. Judging by the crowds, there was a definite need for such a show and it was very well received.

The executive have tentatively planned some of the activities and presentations for the upcoming meetings. Our February meeting will be divided into two parts: First, Ken will demonstrate two music programs - "SIDPLAYER" and "MASTER COMPOSER". In the second part, Earl will demonstrate his "Income Tax" calculator. For the April meeting we are planning on examining database programs. May has been scheduled as a "swap night" in which members will get a chance to trade public domain programs which they have written themselves or have obtained from others and would like to share with other members. June is our final meeting before we break for the summer months. Part of the June meeting is planned as a look at the 1581 disk drive. I hope there will be something meaningful for everyone in each of these meetings.

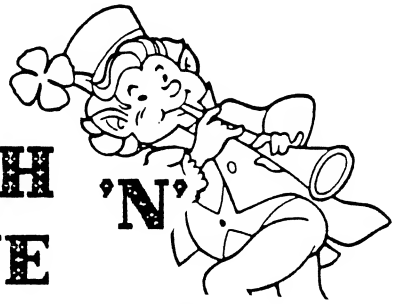
COMPUTER-FEAST!!

COMPUTERFEST, a project of the local Apple Users' Group, was held early in February at the Vagabond Motor Inn. The format was quite similar to last year, with most computer user groups displaying their club's offerings in the Spanish Ballroom and a section (a separate, secured room this year!) for the computer ware "flea market". Also, as was the case last year, the response by both participants and public was phenomenal!

Virtually every computer club in the city was there to hype their group and maybe gain a member or two - including a TI-99A group and an older version ATARI user group. With the removal of the selling table in the middle of the room, the room stayed more comfortable this year. Several local commercial firms had impressive and extensive displays, and did a little Sunday sales business besides showing what they had to offer for virtually every machine represented!

The flea market area was moved to a separate room, which made more space all round. Security was much improved (there was someone watching the single entrance door, checking bags and loosely held computer goods. All purchases were heat-seal bagged in order to pass the door inspector. Unfortunately, although the sale was operated most effectively and efficiently, the goods offered were priced rather high for their condition or usefulness. However, that's not to cast a shadow on the sale itself - it's a great idea, and was well managed. The prices were probably a reflection of the inexperience of the persons putting the items up for sale.

All in all, a great time! Well-attended. I hope all the clubs who made the effort to be involved managed to gain a few new members and enjoyed (as I did) browsing the booths, seeing what other clubs had to offer. Hats off and a pat on the back to all the APPLE USER GROUP MEMBERS for a SECOND great event!! You've every right to be proud. See you next year!



SCRATCH 'N' SAVE

For those of you that picked up the CUGS Income Tax Program last month, my humble apologies. There were about half a dozen errors in the two programs - two were in the child exemptions, and one in the old-age exemption. The others were line duplications which did not affect the outcome of your tax calculation. Please remember to have your copy exchanged.

With our additional purchases of public domain or freeware programs, we will be increasing the size of our library by an estimated twenty-five disks in the next couple of months. Seven of these disks are included in this month's MONITOR. After inclusion, the club will be printing a new CLUB DISK LIBRARY listing, which each paid-up member will receive free copy. Additional copies may be purchased for a buck.

One of the items that I picked up at COMPUTERFEST in February was a good-looking cover for my EPSON printer; or so I thought. Although it is identified as being made for an FX80 or FX85, it is much too small. The dimensions of the cover (my measurements) are 14 1/2 inches wide by 12 inches front to back. If you own a printer with those dimensions, you may purchase it from me for five dollars.

One note in closing that I should have mentioned earlier. When you purchase any club library disk and find any kind of problem with it, or with a program on the disk, please let us know about it. We would like to correct any problems as soon as possible so that others don't run into problems.

IN A DARK, DARK ROOM...

There ...

There on a disk ...

There on a disk, hidden way back ....

Way back on the back shelf, under the (legal) copy of PAC-MAN,

was the PROGRAM!

What program?

The one you wrote back in '86 when you needed a quick way to print a bunch of 3-line labels for your disks. Or the one you wrote in '85 as a math drill for your aspiring 3-year-old Einstein! Or the one you wrote to keep track of your Zone Rec. Sports Team's progress that year they sucked you into coaching!

So, what about these hidden treasures?

So, they are hidden treasures, and you can cash 'em in!!! Any meeting members are welcome to submit public domain software (theirs or others) to the club disk librarian (Earl or assistant Steve) and have your effort immortalized in our next catalogue!

Soon, (watch for it, now), VERY soon, that program in your past could make you part of a very exciting event. In a couple of month's time, we'll be holding our FIRST ANNUAL SOFTWARE SWAP NIGHT. Anyone with public domain ware willing to share can come and SWAP your goods for theirs, as easy and often as you please!! The ONLY restrictions are that the work be truly PD, FREE- or SHARE-ware and that it is not (yet) part of our club library. Your "admission" to the event will probably be permitting the club to ADD your treasure to our library for future members (and those to chicken to share in person)!!

We hope to make it more than just a bunch of odd-looking people sitting around staring at computer screens, so be thinking about it, and start blowin' the dust of YOUR software. Y'all come, y'hear!

MUSIC WITH YOUR BASIC

Our club disks (and many bulletin boards) offer ready-made music to be played in MASTER COMPOSER or SIDPLAYER format. MASTER COMPOSER is a copyright program originally from ACCESS software which allows easy music writing of files which CONTAIN THEIR OWN ML ROUTINE FOR PLAYING as a part of the music file. SIDPLAYER by Craig Chamberlain originally appeared as a series of articles in COMPUTE! a couple of years ago. It has since been upgraded, and now comes with 200+ page instruction booklet and 128/64 variations on a double-sided disk (available from COMPUTE! Publications for $14.95 U.S.) Both give the user exceptional control over the mighty SID chip. Both allow the creation of files which may be loaded into the top end of a BASIC or ML program and played in the INTERRUPT CYCLE of the computer. This means that the music plays (apparently) WHILE THE COMPUTER DOES OTHER THINGS (runs your own BASIC or ML program).

As I said, music files in both formats are available readily in the public domain (our library has 2 disks - called JUKEBOX disks of MASTER COMPOSER files), and a newly-submitted disk full (50 files) of SIDPLAYER selections (many of which you heard at our display at COMPUTERFEST). The following information is presented to allow you to load and play your a selection in one format or the other and add its playing to your own programming. (N.B. MASTER COMPOSER FILES always end with '.C' and SIDPLAYER FILES [new version] end with '.MUS').

To load (and use) a MASTER COMPOSER music file:

1. Move END OF BASIC (to 28000).
2. LOAD the desired music file.
3. Use appropriate SYS or POKEs to play, etc.

   SYS SA + 155 (to start playing)
   POKE SA + 1079,4 (to stop playing)
   POKE SA + 1079,<1 to 3> (stop 1 or more voices.

   For UNALTERED MC pieces, SA=29965.

   MC pieces may be loaded ELSEWHERE in memory, and the SA value is simply changed to reflect the new load address.

To load (and use) a SIDPLAYER music file:

1. The program "SID.OBJ.64" must be on the disk with the selection(s) to be played.
2. Extra lines of code must be added to your program which LOAD SID.OBJ.64 and the actual selection to be played.
3. Use the lines below. The lines from 57000 on MUST NOT BE MOVED OR CHANGED!!
4. Substitute your music file name for the "COMMODORE" in line 200.
5. Each bit of variable SS turns on one of the C64's 3 voices. Thus, POKE SS,1 turns on VOICE 1; POKE SS,4 turns on VOICE 3, and POKE SS,7 turns on all three!

```
120 DN=8:SA=780:SX=781:SY=782:SP=783
130 PRINT " TUNING INSTRUMENTS...":PRINT:GOSUB 570
    00:REM LOAD SIDPLAYER ML
200 F$="COMMODORE":LA=PEEK(49)+256*PEEK(50)+1000:G
    OSUB 57500:REM LOAD SONG
210 SYS HK:REM HOOK (INSTALL)
220 POKE SX,LO:POKE SY,HI:SYS PL:REM SET FOR PLAYI
    NG
230 K=PEEK(SX)+256*PEEK(SY):REM GET ADDRESS OF TEX
    T LINES
240 IF PEEK(K) THEN PRINT CHR$(PEEK(K));:K=K+1:GOT
    O 240:REM PRINT UNTIL CHR$(0)
250 POKE SS,7:REM START PLAYING MUSIC
260 IF PEEK(SS)AND7 GOTO 260:REM STILL PLAYING
270 SYS HU:REM HUSH
280 SYS DP:REM DROP (REMOVE)
290 END
57000 POKE SA,1:POKE SX,DN:POKE SY,1:SYS 65466:F$=
    "SID.OBJ.64":GOSUB 59000
57010 POKE SA,0:SYS 65493:IF PEEK(SP)AND1 GOTO 591
    00
57020 SS=49152:FL=49153:HK=49615:PL=49664:HU=49897
    :DP=49935:RETURN
57500 POKE SA,1:POKE SX,DN:POKE SY,0:SYS 65466:F$=
    F$+".MUS":GOSUB 59000
57510 HI=INT(LA/256):LO=LA-256*HI
57520 POKE SA,0:POKE SX,LO:POKE SY,HI:SYS 65493:IF
     PEEK(SP)AND1 GOTO 59100
57530 LA=PEEK(SX)+256*PEEK(SY):RETURN
59000 FOR K=1 TO LEN(F$):POKE 584+K,ASC(MID$(F$,K)
    ):NEXT
59010 POKE SA,LEN(F$):POKE SX,73:POKE SY,2:SYS 654
    69:RETURN
59100 P=PEEK(SA):PRINT " ERROR: ";:IF P=4 THEN PRI
    NT "FILE NOT FOUND":END
59110 IF P=5 THEN PRINT "DEVICE NOT PRESENT":END
59120 PRINT ST:END
```

UPCOMING CUGS MEETINGS FOR 1988

Wed. Apr. 6
Wed. May 4
Wed. June 1

Write these on your calendar.

All meetings start at 7:00 pm

Meetings at the Northwest
Leisure Centre
Room 2

CUGS DISK LIBRARY ADDITIONS - MARCH

COMMUNICATIONS5 XE

CUGS LOADER
 CUGS DATA

MULTI TERM 4.8
 MULTI4.8-1
 MULTI4.8-2
MULTITERM4.5DOC
BOOT
 SETUP
 VER3 DOCS
 TITLE
 AZ
 MAIN
 MENU.DOW
 NU.MES
 SYSOP
 MAIN1
 RR.INST
 1200FIX.51976
 SEQ.ML
 SCBBS.ML
 DOW.SECT
 SCBBS
SPRINT IV
MULTI TERM 5.2
 MULTI5.2-1
 MULTI5.2-2

COMMUNICATIONS6 XF

CUGS LOADER
 CUGS DATA

SPRINT IV
LIST ME 1ST
UPDATE NOTES
C/EBBS64/2.37
TERM.C1 V2
MLS.64
 ACS
 64 FM
 64 UTIL
 64 CONFIG
 TERMINAL C1.V2
ALL AMERICAN BBS
 START HERE
 AA SETUP V6.7
 CREATE BBS V6.7
 D/L DIR CREATE
 EDITOR V6.7
 BBS DOWN V6.7
 BBS.DOC
 AA BOOT V6.7
 AA CGBBS V6.7
 USERIDS
 BULLETINS
 AAPARAM64

SOUND 7 SG

CUGS LOADER
 CUGS DATA

SINE IN.C
RANDOM MUSIC.C
M/L MUSIC.C
 PLAY.D
 ENTER.D
 INVEN8.D
GUITAR TUNER
CULTURE CLUB.C
 CHAMELEON.D
FUNK ROCK.C
SOUND SUB.C2
NAME THAT NOTE
MUSIC LESSON.C
AMERICA.C
TREK THEME.C
MOSQUITO
NETWORK XXIII
AXEL F
MUSIC MENU
 E/PCLD
 E/F HOLY FAM
 4TH COM
 E/F 4TH SM
 E/F PN SM
 PUER NOBIS
O SACRED HEAD
 OSH PLAY
 A MON SECOURS
 4EME COM
MUSIQUE-MENU
 FR/PUER NOBIS
 F/PCLD
CLAVIER

GRAPHIC 8 G8

CUGS LOADER
 CUGS DATA

SNAPSHOT
 SNAPSHOT.49444
SNAPSHOT DEMO
PRINT MAKER
 PRINT.49152X
COORDINATOR.LDR
OBJECT MAKER
 A COORD.OBJ
 B COORD.OBJ
COORD DEMOS
COORD LOAD & DIS
MOVIEMAGIC V3.3
 SUPERBOY MOVIE
 COMMODORE MOVIE
 AUDREYII
 SPRING BREAK
 PIRATE SHIP II
 SHIP DESTROYED
 CAPTURED
 BRITISH FLAG
 PIECE OF MIND
 ACES HIGH
 SOMEWHERE IN TIM
 IRON WHAT!
 IRON MAIDEN LOGO
 2 MINS TO MIDNIG
 CYBORG
 POWERSLAVE II
 VAN HALEN
 MAXELL MINI
 MAXELL 5 INCH
 TWISTED SISTER
 NIGHT PROWLER
LETTERMAKER V
 TRAP
 IRIDIS ALPHA
 ARCANA
 PARALLAX
 DRACULA
 NUCLEAR E.
 FRANK BRUNO
 COMMANDO
 N.E. STORY
 KAISER
 RAMBO
 HACKER
 DOC & DEMO

GENERAL 11 MK

CUGS LOADER
 CUGS DATA"

LIFESCORE.Z
RANDOM LOTTO.C
DEFINITION.C
THE GREAT FRED.C
MATH ATTACK
WEATHER PROPHET
ROBOT MATH
LEARNIN TO COUNT
FLAGS.C
BASIC KEYWORDS.C
BIORYTHM COMPAT
BIBLEQUIZ

GRAPHIC GAMES12 AL

CUGS LOADER
 CUGS DATA

BOWLING.C2
FORBIDDEN CRYPT
EAGLES & GATORS
POWERBALL
 POWERBALL.49152
GOING UP
S & E CUSTOM LDR
S & E CUSTOMIZER
SAM & ED
SQUEEZE
 SQUEEZE.50542
SALOON SHOOTOUT
 SALOON.10240
QUEEN'S QUARREL
CHOPPER 1
SLOTS
BUMP'N RUN
 BUMP'N RUN.49152
 MATCH BLOX
 Q-BIRD
 DECIPEDE
 DEC.ML
 ARCADE BASEBALL
 PREDICTOR
 PREDICTOR.49152
 SNO-CAT
 SUPER CONNECT 4
 SPACE ARENA
 ARENA.49152
 FACE-OFF
 KICKER
 KICKER.OBJ
LEXITRON
 SHIFTER
 SURVIVOR"
 SURVIVOR.OBJ
 DUNK
 DUNK.49152
 LAWN
 SNOOPY RUN.2

DISK UTILITIES7 DG

CUGS LOADER
 CUGS DATA

CODING COMMENTS
QUICKFIND
TAPEMAKER 64
CATSTRAPOLATOR
UNIV DISK RTNS
FORMAT EASY/SCPT
 FILE.READER.OBJ2
MANAGER DOC.C
MANAGER 64.C
ML SAVE TO DISK
MENU SYSTEM
NOTEMAKER
CHRONO-WEDGE
 CHRONO.49152
FAILSAFE
SEQ FILE EDITOR
ADDRESS CATALOG
 TURBODISK 64.BOC
 TURBODISK 64
TURBO BOOTMAKER
TURBODISK REL
LINE EXTENDER
TURBO FORMAT
DIRECTORY.C
LIST-ME QUIZ.L
QUIZ.C
PRINT QUIZ.C
PGM SELECTOR #3
RELATIVE FILES
LIBRARY INDEX.C
DISK HOUSE.C
DISK-O-64.BOOT
 DISK-O-64
MAINT.ONE
NO-SYS BOOT
NO-SYS LOADER
DIRECTORY FILER+
DISK VACUUM
FASTLOAD
FASTFORMAT
DISK RESTORE.C
RESTORE.DOC
DISK DISASSEMBLR
DISK EDITOR
 DISK ED.12000
SPRINT IV

Whooops!

Whoops! I knew it would happen - as soon as you start adding listings to a mag such as ours, the editor's eyesight begins to fail and some silly typos enter the picture. I hope noone's ready to kill over the two small errors below. Remember, I'll happily accept vitriolic criticism from anyone who's ever edited a perfect paper (please attach proof).

In the 128 WINDOW program to display graphic pictures, line #60 of the MULTICOLOR BIT MAP LOADER should have read...

```
60  BLOAD"<COLORMEMORY MAP>",B15,P55296
```

(It appears I gave the 128 an extra memory bank (B16) in last month's article.

In the 64 version of the same program, my printer happily omitted a couple of Commodore graphics and replaced them with some unexpected linefeeds erasing line numbers in the process. The lines following line #58 should read ...

```
100 PRINT"PRESS 'D' TO SEE DRAWING"
110 PRINT"PRESS 'N' TO RETURN TO NORMAL SCREEN"
120 PRINT"PRESS 'Q' TO QUIT"
```

Sorry for the goofs. We'll keep trying to get better.

128 Window:

Just a short column this week - the 128 version of the SIDPLAYER article for the C64. Next week, I'll print the listing of the DEMO program used at COMPUTERFEST!

```
120 DN=8
130 PRINT " TUNING INSTRUMENTS...":PRINT:GOSUB 570
    00:REM LOAD SIDPLAYER ML
200 F$="COMMODORE":LA=PEEK(51)+256*PEEK(52)+1000:G
    OSUB 57500:REM LOAD SONG
210 SYS HK:REM HOOK (INSTALL)
220 SYS PL,0,LO,HI:REM SET FOR PLAYING
230 RREG ,SX,SY:K=SX+256*SY:REM GET ADDRESS OF TEX
    T LINES
235 BANK 1
240 IF PEEK(K) THEN PRINT CHR$(PEEK(K));:K=K+1:GOT
    O 240:REM PRINT UNTIL CHR$(0)
245 BANK 15
250 POKE SS,7:REM START PLAYING MUSIC
260 IF PEEK(SS)AND7 GOTO 260:REM STILL PLAYING
270 SYS HU:REM HUSH
280 SYS DP:REM DROP (REMOVE)
290 END
57000 BLOAD "SID.OBJ.128",U(DN),B0:BANK 0:SYS 1961
    8:BANK 15
57010 SS=4864:FL=4865:HK=5327:PL=5395:HU=5644:DP=5
    682:RETURN
57500 BLOAD (F$+".MUS"),U(DN),B1,P(LA)
57510 HI=INT(LA/256):LO=LA-256*HI:LA=PEEK(174)+256
    *PEEK(175):RETURN
```

SIR RICHARD'S BASIC

In the last two articles, I examined sequential data files. In this article I will turn to relative data files. A relative file is one which allows data to be accessed in random order either for READ or WRITE purposes. This is definitly different from sequential files which must be read from and written to starting at the first character in the file. To obtain this random accessing of data some special programming sequences are involved in preparing the file structure. (Note: although relative files could be referred to by the name "random access file", this term is more correctly used to refer to another type of file - user files. You should be careful not to confuse the two as they involve completely different programming techniques.)

Before examining the details of relative data files, the differences between sequential files and relative files should be noted. The main difference between te two is in how data in the file is accessed. Sequential files must have data accessed sequentially, from the start to the data you want. Relative files can have data accessed in any order wanted. Sequential files can have data of variable length while relative files require that all data items must be of the same length. As a result of the two above mentioned differences, relative files usually require much more disk space than sequential files but data can be accessed much faster than sequential files. Relative files require two disk buffers for operation of the file while sequential files only require one buffer. As a result, more sequential files can be accessed simultaneously than relative files. It should also be noted that relative files can not be used on a cassette which must access data sequentially.

In this article I will use BASIC 2 when looking at relative files. If you have a 128, BASIC 7.0 contains a number of commands (DOPEN#, RECORD#, DCLOSE) which make working with relative data files much simpler than the BASIC 2 version. BASIC 2 commands will work however on any upgraded version of BASIC.

The preparation and use of relative data files usually involves THREE distinct steps. (and usually a minimum of TWO different programs.) These steps are:

1) Reserve space on the diskette for the file.
2) Fill up the space with some character. (Called padding the file.)
3) Use the file by writing data to it, reading data from it, or changing data values.

The first two steps are often done in one program which has the function of initializing the file. A separate program is usually then used to access the data from the file.

1) Reserving space on the diskette for the file.

Before looking at the process of preparing the diskette to store a relative file, the structure of a diskette should be reviewed. Data is stored on the diskette in BLOCKS. Since a block contains 256 bytes of storage and 2 bytes are required to link to the next block, the maximum length of an individual unit of data is 254 bytes. Each individual unit of data is called a RECORD.

To create a relative file there are two values that must be determined before the program to create the file can be written. The first value is the number of records. The number of records is the number of units of data that are to be stored. The number of records can be set larger than actually needed and the maximum is only limited by the space available on the diskette.

A second value needed is the total of the lengths of all the FIELDS within the record. A field is an individual unit of data. Fields of data are best written using carriage returns (ASCII code 13) to separate each field. Doing this makes it much easier to access individual fields later. The total length is determined by adding the lengths of each field plus 1 for a carriage return for each field. This total length CANNOT EXCEED 254.

2) Padding the file.

This process involves putting some initial data in the space that has been reserved so that the main program has something to read from the disk. The padding of the file can be done with any character but be careful that the character chosen doesn't make it hard to work with data later.

3) Main program.

This program is the one that actually uses the relative file. It is used to enter, change, or delete any data on the relative file.

CREATING A RELATIVE DATA FILE

As mentioned above, this usually involves two steps. The first step is to initialize the file - set up on the diskette the space to store the data. The second step is to fill the file with some character - called padding the file. Although this second step is not strictly required, it is good programming to include it and it also gives a quick check for errors in the file formation. These two steps are usually included in one program whose only function is to create the file. This program is completely separate from another program which uses the file to actually store data.

Before creating a relative data file, two pieces of information must be determined. These are: 1) record length - total of the lengths of all fields plus 1 for the carriage return for each field; and 2) number of records - how many records are to be stored, this should be slightly larger than the suspected number needed. A great deal of thought should be put into the determination of these because once the file has been created, it cannot be changed without losing any data that has been entered.

To make it easier to follow, I will use an example of an address book in working with relative data files. My address book will contain the following fields (length of each in parentheses): last name (15), first name (12), street (25), city (15), province (4), postal code (7). The total record length is 83 (15+1+12+1+25+1+15+1+4+1+7=83). I am going to make my file hold 200 records. The explanation of the process follows. You may want to follow the sample program at the end as you read through the remainder of this article.

There are THREE steps involved in creating a relative data file with BASIC 2.

OH...

A) OPEN A LINE OF COMMUNICATION.

In actual fact opening a line of communication involves two parts. First a line of communication must be set up to the disk command channel (secondary address 15). Second, a file must be opened over regular channels to pass the data.

```
OPEN 15,8,15
OPEN lfn,8,sa,"file name,L," + CHR$(rl)
```

The first statement opens the line of communication to the disk command channel.
The second statement opens the relative file.

lfn - logical file number used in opening the file. (I will use 2)
sa - secondary address (2 - 14). (I will use 2 here also)

L - length (note comma before and after)

rl - length of each record in file (0< rl <255) (ours = 83).

B) MARK THE LAST RECORD IN THE FILE.
This is done with one statement.

```
PRINT#15,"P"+CHR$(sa+96)+CHR$(lb)+CHR$(hb)+CHR$(pl)
```

"P" - position or pointer - this tells the disk drive to look for a certain record.

sa - secondary address used in opening the file. This must be added to 96.
lb - low byte of record number
hb - high byte of record number
pl - place in record. This usually is 1 (one) to indicate the start of the record.

To calculate the low and high bytes of a record use the following formula. The high byte is the integer of the record number / 256. The low byte is found by taking the record number - hb*256. If rn = record number; lb = low byte; and hb = high byte; then hb = int(rn/256) and lb = rn - (hb*256). This calculation is a real pain so the easiest way to use it is to put it in a subroutine and let the computer calculate it for you. All you have to do is to send the record number to the subroutine. See lines 10000 - 10050 in the sample program.

Note that you position to a record through the COMMAND CHANNEL (sa = 15). In a program use a statement like: RN= 200:GOSUB 10020 to position to the last record. Now something (like 'end') should be printed on this record which will cause all other records to be created. This is done by using PRINT#2,"END".

C) CLOSE THE FILES.

To close the files, simply use the close statement for all opened files. If you close the command channel at this time, you will get a flashing light on the disk drive which indicates an error. This error, however, is the "record not present error" which is not really an error as the record wasn't present but you just created it.

```
CLOSE lfn
```

MORE...

CHECKING FOR ERRORS

At every step the disk should be checked for errors. This is done using the normal error checking routine except one additional error must be "trapped". This error is number 50 - record not present error. This error condition will exist until after the file has been created. To check for errors and also trap error #50 set a flag to 0 (FL=0) and then gosub to an error subroutine (see lines 10100 - 10160 in the sample program).

PADDING THE FILE

Once the file has been created, it should be padded (filled with characters) to make it easier to put data into the file and to distinguish a filled record from an empty one. The character(s) selected for padding must be chosen with great care as improperly chosen characters could later affect the flexibility of using the data.

The easiest method to pad the file is to create a string which consists of all the padded fields added together with a chr$(13) between each. The actual padding process consists of FOUR steps:

A) CREATING THE PADDING STRING.

Creating the padding string involves making a string of characters which can be stored in each record on the diskette. This is done so that a character will appear to mark the fields to make data entry simpler. The choice of a character (or characters) to pad the file is very important. You must pick a character that will not interfere with data entry. For example - a letter of the alphabet, while easy to use, could cause interference with searches through actual data later.

The procedure is very simple. Pick the longest field and create a string the length of this field and assign it to a variable. By using the left$(function, parts of this string are added together to create one string for the record. After each field (except the last) add a chr$(13) as a field separator. For my example I am going to use a plus sign (+) followed by blanks as my padding string. Let p$ = "+ " ('+' then 24 spaces). Build the padding string by: pd$ = left$(p$,15) + chr$(13). This covers the first field. To add the second field use: pd$ = pd$ + left$(pd$,12) + chr$(13). Continue to add the third field: pd$=pd$ + p$ + chr$(13) and the fourth field: pd$ = pd$ + left$(pd$,15) + chr$(13). Continue in the same manner to add the fifth and sixth fields. pd$ will now have a length of 83 bytes. Do not put a carriage return after the last field - one is put automatically when the file is printed to the diskette. VERY IMPORTANT: THE LENGTH OF THE PADDING STRING MUST EQUAL THE RECORD LENGTH SPECIFIED WHEN THE FILE WAS OPENED.

B) OPENING THE LINE OF COMMUNICATION.

A relative file is simultaneously opened for both reading and writing.

```
OPEN lfn,8,sa, "file name"
```

C) PRINTING THE PADDING STRING TO THE RECORDS.

There are two steps involved in printing the padding string. First, the read/write head must be positioned to the record and then second, the padding string can be written to the disk. Both of these steps are usually repeated within a loop so that every record in the file will be padded. BASIC 2 has a problem with the positioning to a record - the read/write head sometimes gets lost. To prevent this from happening you must reposition the pointer after each record is printed.

cont'd -

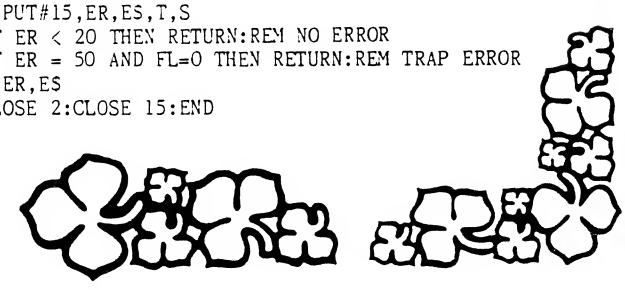
D) CLOSE THE FILE.

Once all work is completed, the files must be closed.

CLOSE lfn : CLOSE 15

In the next article I will examine writing a program to write data to the file and access the data from the file.

```
100 REM RELATIVE FILE ** ADDRESS **
110 :
120 REM RECORD LENGTH = 83 // # RECORDS = 200
130 :
200 REM CREATE RELATIVE FILE
210 :
220 :   PRINT "CREATING FILE ** ADDRESS **"
230 :   OPEN 15,8,15
240 :   OPEN 2,8,2,"ADDRESS,L," + CHR$(83)
250 :   FL=0:REM RECORD NOT PRESENT FLAG
260 :   GOSUB 10120:REM ERROR?
270 :   RN = 200:GOSUB 10020:REM POSITION TO LAST RECORD
280 :   PRINT#2,"END":REM CREATE FILE
290 :   GOSUB 10120:REM ERROR?
300 :   CLOSE 2:REM FILE NOW CREATED
310 :
400 REM PAD FILE
410 :
420 :   REM CREATE PADDING STRING
430 :
440 :       P$="+                    ":REM '+' AND 24
SPACES
450 :       PD$=LEFT$(P$,15)+CHR$(13):REM LAST NAME
460 :       PD$=PD$+LEFT$(P$,12)+CHR$(13):REM FIRST NAME
470 :       PD$=PD$+P$+CHR$(13):REM STREET
480 :       PD$=PD$+LEFT$(P$,15)+CHR$(13):REM CITY
490 :       PD$=PD$+LEFT$(P$,4)+CHR$(13):REM PROV
500 :       PD$=PD$+LEFT$(P$,7):REM POSTAL CODE
510 :       IF LEN(PD$)<>83 THEN PRINT"ERROR":STOP
520 :
530 :   REM WRITE PADDING STRING TO RECORDS
540 :
550 :       OPEN 2,8,2,"ADDRESS":REM OPEN FILE
560 :       FL=1:REM RECORD NOT PRESENT - NOW AN ERROR
570 :       GOSUB 10120:REM ERROR CHECK
580 :       FOR RN = 1 TO 200:REM PADDING LOOP
590 :           GOSUB 10020:REM POSITON TO RECORD
600 :           PRINT#2,PD$:REM PRINT PADDING STRING  TO
RECORD
610 :           GOSUB 10120:REM ERROR CHECK
620 :              PRINT"home   PADDING   RECORD";RN:REM
MESSAGE
630 :           GOSUB 10020:REM REPOSITION TO RECORD
640 :       NEXT RN
650 :       CLOSE 2:CLOSE 15:REM DONE - CLOSE FILES
660 END
670 :
10000 REM SUBROUTINE TO POSITION TO RECORD
10010 :
10020 :   HB = RN/256:LB = RN - (HB*256)
10030                                              :
PRINT#15,"P"+CHR$(98)+CHR$(LB)+CHR$(HB)+CHR$(1)
10040 :
10050 RETURN
10060 :
10100 REM ERROR CHECK
10110 :
10120 :   INPUT#15,ER,ES,T,S
10130 :   IF ER < 20 THEN RETURN:REM NO ERROR
10140 :   IF ER = 50 AND FL=0 THEN RETURN:REM TRAP ERROR
10150 :   ? ER,ES
10160 :   CLOSE 2:CLOSE 15:END
```



Don't Miss Out!

PRIZE DRAW - CUGS 1988

At each CUGS meeting during 1988 there will be a computer generated draw for a winner of a prize.

RULES:

Paid up members for 1988 only will be eligible.

Draw will be made at the end of each meeting.

The winner must be present at the meeting to claim the prize. If the drawn member is not present, further draws will be made until the prize is distributed.

All prizes must be accepted as is - no substitutions permitted.

The membership list will be updated at break during each meeting so that new members will be included in the draw.

Prize for March draw - disk box

February winner was - Steve Bogues

NEXT MEETING

Wednesday
April 6, 7 pm

Northwest Leisure Centre

Databases in Detail!
A careful look at several currently available for the C64/128.